

What is claimed is:

1. A method for fixed codebook search comprising:

calculating absolute values of pulse position likelihood estimation vectors of pulse positions for each track in a plurality of tracks;

selecting a predetermined number of pulse positions for each track in a descending order of the absolute values of the pulse position likelihood estimation vectors;

selecting one pulse position among the selected pulse positions for each track, per each track, creating all possible pulse position combinations consisting of the selected pulse positions, and conducting a complete search for the all possible pulse position combinations; and

selecting one pulse position combination among the all possible pulse position combinations subjected to the complete search.

2. The method of claim 1, wherein in selecting one pulse position combination among the all possible pulse position combinations subjected to the complete search, a pulse position combination satisfying the following equation is selected:

$$\text{Max} \frac{C_k^2}{E_k} = \text{Max} \frac{(d^t c_k)^2}{c_k^t \Phi c_k},$$

wherein c_k is a k-th fixed codebook vector, superscript t indicates a transpose of a matrix or a vector, and d is a correlation vector.

3. The method of claim 1, wherein the pulse position likelihood estimation vector is calculated using a pitch residue signal and correlation vector information.

4. The method of claim 1, wherein the pulse position likelihood estimation vector is calculated by the following Equation:

$$b(n) = \frac{r_{LTP}(n)}{\sqrt{\sum_{i=0}^{39} r_{LTP}(i) r_{LTP}(i)}} + \frac{d(n)}{\sqrt{\sum_{i=0}^{39} d(i) d(i)}},$$

wherein $r_{LTP}(n)$ is a pitch remaining signal and d is a correlation vector.

5. A computer readable medium having embodied thereon a computer program for a fixed codebook search method comprising:

calculating absolute values of pulse position likelihood estimation vectors for respective pulse positions for each track in a plurality of tracks;

5 selecting a predetermined number of pulse positions for each track in a descending order of the absolute values of the pulse position likelihood estimation vectors;

selecting one pulse position among the selected pulse positions for each track, per each track, creating all possible pulse position combinations consisting of the selected pulse positions, and conducting complete search for the all possible pulse position combinations; and

10 selecting one pulse position combination among the all possible pulse position combinations subjected to the complete search.

15 6. An apparatus for fixed codebook search comprising:

a unit for calculating an absolute value of a pulse position likelihood estimation vector, which calculates absolute values of pulse position likelihood estimation vectors for respective pulse positions for each track;

20 a pulse position selector which selects a predetermined number of pulse positions for each track in a descending order of the absolute values of the pulse position likelihood estimation vectors, using the absolute value information of the pulse position likelihood estimation vectors;

25 a unit for conducting a complete search, which selects one pulse position among the selected pulse positions for each track, per each track, creating all possible pulse position combinations consisting of the selected pulse positions, and conducts complete search for the all possible pulse position combinations; and

an optimal pulse position selector which selects one pulse position combination among the all possible pulse position combinations subjected to the complete search.

30 7. The apparatus of claim 6, wherein the pulse position likelihood estimation vector is decided using a pitch remaining signal and correlation vector information.

8. The apparatus of claim 6, wherein the pulse position likelihood estimation vector is calculated by the following Equation:

$$b(n) = \frac{r_{LTP}(n)}{\sqrt{\sum_{i=0}^{39} r_{LTP}(i)r_{LTP}(i)}} + \frac{d(n)}{\sqrt{\sum_{i=0}^{39} d(i)d(i)}},$$

wherein $r_{LTP}(n)$ is a pitch remaining signal and d is a correlation vector.